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NASA To "Map" Big Bang Remnant to Solve Universal Mysteries

The Microwave Anisotropy Probe (MAP), scheduled for launch June 30, will journey into deep space on a voyage to explore some of the deepest mysteries of the cosmos. Scientists hope to determine the content, shape, history and the ultimate fate of the universe, by constructing a full-sky picture of the oldest light.

MAP is designed to capture the afterglow of the Big Bang, which comes to us from a time well before there were any stars, galaxies or quasars. Patterns imprinted within this afterglow carry with them the answers to mysteries such as: What happened during the first instant after the Big Bang? How did the Universe evolve into the complex patterns of galaxies that we see today? Will the Universe expand forever or will it collapse?

To answer these questions, MAP's measured pattern of the Big Bang's afterglow, like a fingerprint, will be compared against the unique fingerprint pattern predicted by each cosmic scenario to find the right match.

"We are tremendously excited about this mission because it will help answer basic questions that people have been asking for ages," said Dr. Charles L. Bennett, Principal Investigator for the MAP mission at NASA's Goddard Space Flight Center. "MAP's unprecedented accuracy and precision will allow us to determine the nature and destiny of the universe."

According to the Big Bang theory, the universe began about 14 billion years ago as an unimaginably hot and dense fog of light and exotic particles. The Universe has since continuously expanded and cooled.

The whole Universe is bathed in the afterglow light from the Big Bang. The light that is now reaching us has been traveling for about 14 billion years, thus allowing us a look back through time to see the early Universe.

MAP views the infant universe by measuring the tiny temperature differences within the extraordinarily evenly dispersed microwave light, which now averages a frigid 2.73 degrees above absolute zero temperature.

MAP will resolve the slight temperature fluctuations, which vary by only millionths of a degree. These

temperature differences point back to density differences in the young Universe, where denser regions gave way to the vast web-like structure of galaxies that we see today.

A great deal of effort over the past 35 years has gone into measurements of the afterglow light from the Big Bang. In 1992, NASA's Cosmic Background Explorer satellite discovered tiny patterns, or "anisotropy," in its full-sky picture of the light. Balloon-borne and ground-based experiments have further advanced our knowledge. The upcoming MAP full-sky picture, to be made with unprecedented accuracy and precision, will dramatically revolutionize our view of the Universe.

MAP required an extraordinary design to achieve its accurate and precise measurement capability. "Nothing has ever been built like it before," said Dr. Edward Wollack, a science team member at Goddard.

After a three-month journey, MAP will begin to chart the faint microwave glow from the Big Bang. It will take about 18 months to build up a full-sky picture and perform the analysis.

The MAP hardware and software were produced by Goddard and Princeton. Science team members are also located at the University of Chicago, IL; the University of California, Los Angeles; Brown University, Providence, RI; and the University of British Columbia, Vancouver.

MAP, an Explorer mission, cost about \$145 million. More information is available on the Internet at: <http://www.gsfc.nasa.gov/gsfsc/spacesci/map/map.htm> and <http://map.gsfc.nasa.gov>

Students Get Experiments Ready for Space Shuttle

High school students from across the country spent last week at Wallops preparing their experiments for flight on the Space Shuttle. The experiments were chosen for flight through the NASA Student Involvement Program (NSIP) flight opportunity competition.

The students prepared and integrated their experiments in a Space Experiment Module (SEM) that is currently scheduled to fly on a Space Shuttle in April 2002. Wallops personnel in the Space Shuttle Small Payloads Office and NSROC worked with the students to test the experiments before integration.

"The NSIP truly provides an opportunity for students to learn that with perseverance, The Sky is Not The Limit," said Lynne Zielenski, teacher and advisor for the student team from Glenbrook North High School, Northbrook, Ill.

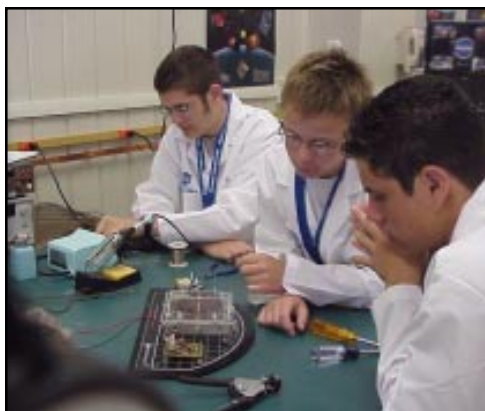
In addition to Glenbrook, other schools participating include Agoura High School, Agoura, Cal.; DuVal High School, Lanham, Md.; and The Northwest School, Seattle, Wash.

The Agoura High School experiment, Mechanical Resonators in Space, included two dual-mode mechanical resonators. One is for ground-based experiments; the other is for space-based equipment. The students demonstrated by analysis and measurements that parasitic mode coupling occurs in a dual mode resonator due to gravity. A space flyable working resonator prototype has been developed and fabricated.

DuVal High School's Artemia Space Launch Experiment is to determine the effect of microgravity on the hatching, growth, development and activity level of brine shrimp. They will video tape the experiment in the SEM module and compare it to a videotape of a ground control unit.

The Aeroponics: Food Cultivation in Space is an active experiment by Glenbrook North High School that will subject plants to an aeroponic environment in microgravity. This will test aeroponics technology in space.

The Northwest School students want to find out if microgravity affects the velocity of laminar fluid flow. Water will be pumped around a circular tube with a flow meter and data logger recording the flow rate.



PAO Digital Photo
Agoura High School students prepare their experiment for integration into the SEM.

Environmental Facts

Did you know?

Goddard Space Flight Center spent \$250K to dispose of 26,083 pounds of hazardous waste in FY00. The cost includes disposal of materials from Greenbelt and Wallops.

Both sites have permits under the Clean Air Act that regulate air discharges. GSFC is not immune to non-conformance of these standards that may lead to Notices of Violations and fines.

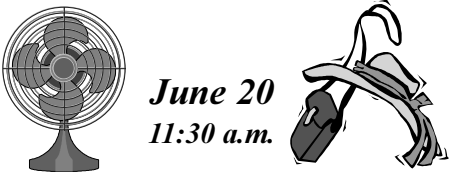
Greenbelt’s water and wastewater systems are served from the local municipality. Wallops operates its own water and wastewater systems.

All wastewater discharges are monitored by respective states (MD and VA) to ensure that we are complying with our discharge permits.

Building 305 at Greenbelt is a National Historic Landmark.

Both sites have strong Wildlife Management Programs. Greenbelt’s wildlife program is focused primarily on managing the deer and goose population. In addition to deer and geese, Wallops wildlife program also includes protection of endangered and threatened species such as the Bald Eagle and the Piping Plover.

Tailgate Sale



June 20
11:30 a.m.

Flag Court Parking Lot

If it rains the sale will be held in the Picnic Pavilion.

Upcoming Training
Occupational Ergonomics

July 18 and 19
8 a.m. to 4 p.m.
Building E-2

Software System Safety

July 31 to August 3
8 a.m. to 4 p.m.
Building E-2

These courses are offered at no cost to all NASA and contractor employees.

Employees need to fill out the course registration form that requires their supervisor’s signature.

Additional information and course registration form can be found at: <http://www.wff.nasa.gov/~code803/pdf/occergo01.pdf> and <http://www.wff.nasa.gov/~code803/pdf/software01.pdf> or call Curtis Oakley, x2290.



Notes from the Gardener

Bracing for beetle attacks

Use a combination of prevention and control strategies against Japanese beetles. Prevent them in the first place by cutting lawns at two inches or taller to discourage beetles from laying their eggs in the grass. Spray grass with predatory nematodes or water in milky spore disease to kill their white grub larvae lurking in the soil just under the turf.

Control the numbers of adult beetles by identifying their favorite plants. Visit these plants often and knock the beetles into a jar of soapy water. Treat overwhelming infestations of adult beetles with a pesticide product containing pyrethrum.

Best fertilizer for roses

The best fertilizer for roses just happens to be mushy bananas. Bury one old brown banana at the base of each of your rose bushes or lay the peels flat on the soil. Repeat every few weeks as the peels decompose. The peels act as a time-release fertilizer rich in calcium, magnesium, sulfur, and phosphates — all things roses love.

Wallops Shorts.....

It’s here! The summer solstice occurs on June 21, at 3:38 a.m.

Coming up

Runway friction tests, June 19-22

NASA Langley Research Center aircraft noise tests, June 25 - July 6.

NASA Black Brant V launch (nighttime) from Wallops Island, June 26 - July 9

From FEDweek
June 13 Issue

I Fund Has Rocky Debut

One of the two Thrift Savings Plans funds that began in May, the international stock (I) fund, got off to a rocky start, losing 4.13 percent for the month. The other new fund, the small-capitalization U.S. stock (S) fund, gained 1.42 percent in May.

Meanwhile, the common stock (C) fund in May gained 0.65 percent; it has lost 10.55 percent over the last 12 months. The government securities (G) fund gained 0.47 percent and the bond (F) fund gained 0.61 percent last month, for 12-month returns of 5.63 and 13.18 percent, respectively.

NASA Federal Credit Union
Member Appreciation Day

Don’t miss the benefit of a lifetime!

June 27, 2001
11 a.m. to 1 p.m.

Building E-2 - Cafeteria

Representatives will be available to explain all of the convenient, economical financial products and services offered to you and your family members. Let us show our appreciation with giveaways and good cheer to all our Wallops members.

Besides great financial services, you will have a chance to win an American Express Gift Check, Shorebirds baseball tickets and other great door prizes!

Savings Bond Campaign
June 11-22

NASA Day at
Kings Dominion

NASA Day at Kings Dominion will be July 28, 2001. A limited number of tickets will be available at the Exchange Store. The cost will be \$29 for adults and \$23 for children. The ticket price includes admission plus a meal ticket for an “all you can eat” luncheon consisting of:

- Roasted Chicken, Hot Dogs, Hamburgers
- 2 Sides (Fresh Fruit & Pasta Salad)
- Rolls
- Condiments (includes Chili & Cheese for hot dogs)
- Soft Drink or Ice Tea
- 1 Dessert

Contact Karen Annis, x2020, or stop by the Exchange in Building E-2 between 10 a.m. and 2 p.m., Monday - Friday.

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